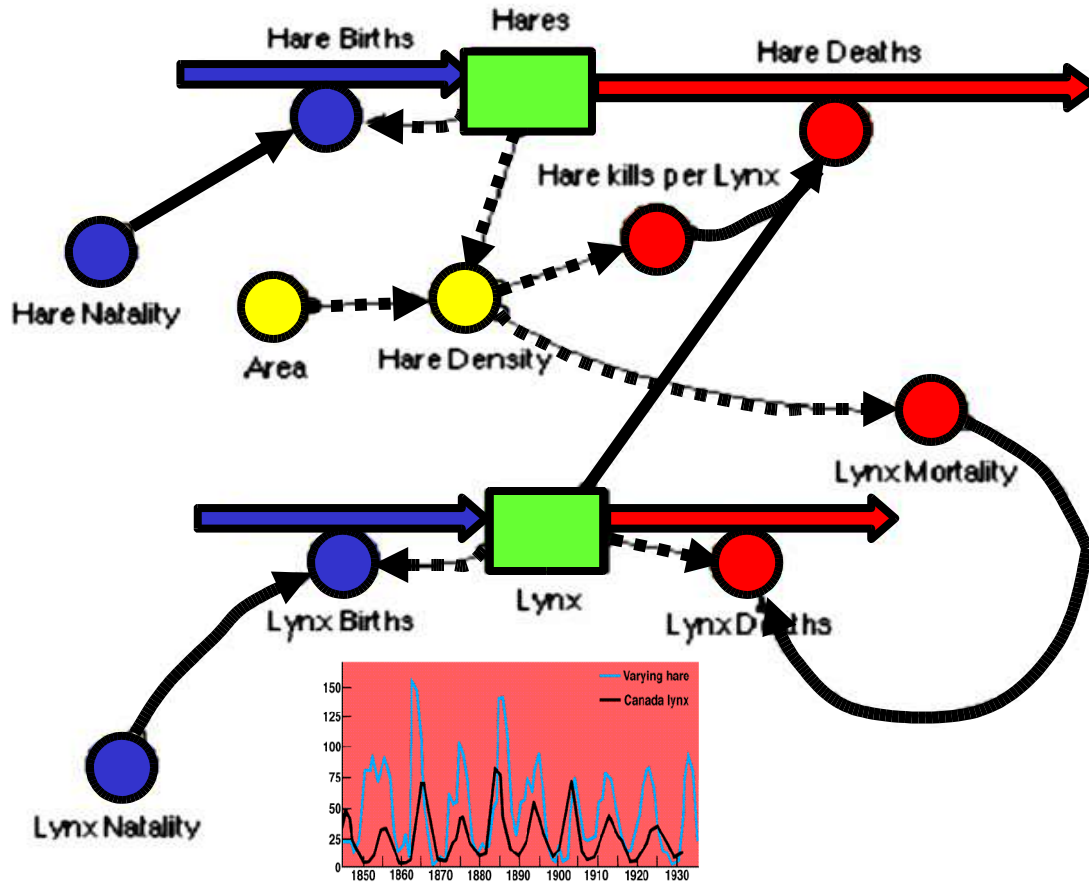
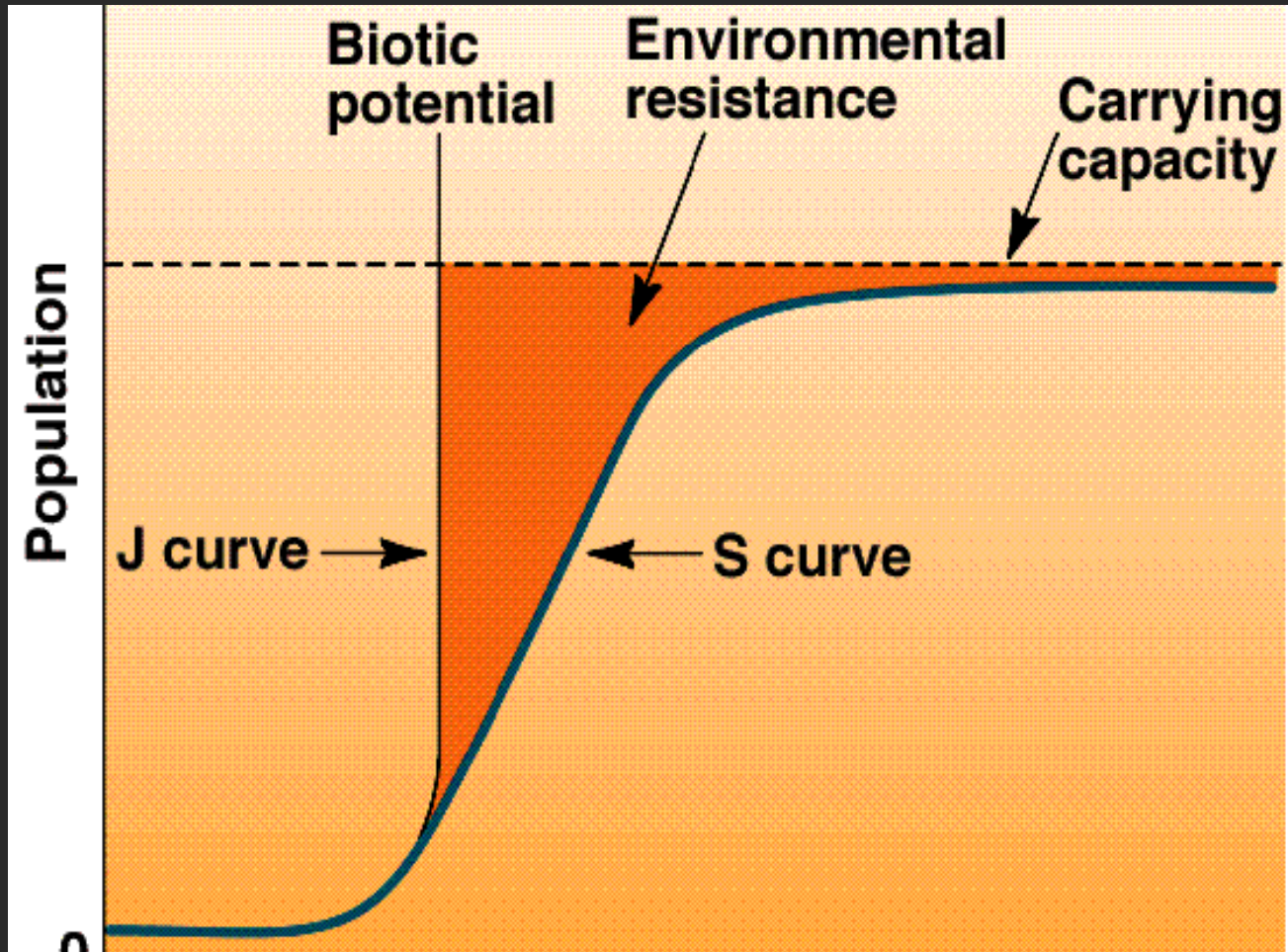


FORESTER DIAGRAMS



POPULATION CHANGE

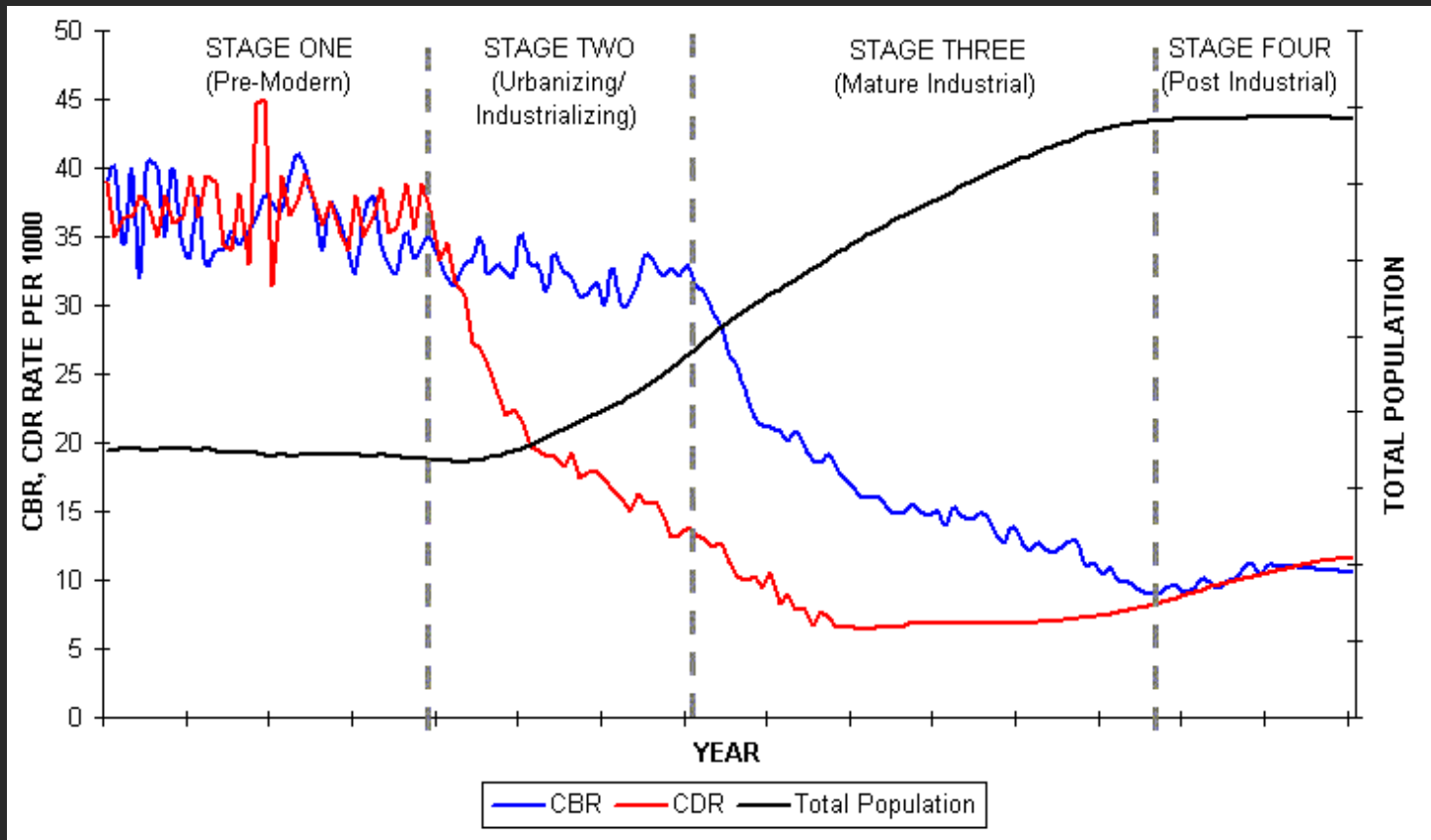


POPULATION CHANGE

DEMOGRAPHIC TRANSITION: when death rates and birthrates decline in response to improved living conditions

Warren Thompson (1929) observing birth and death rates in industrialized world since the 18th century

DEMOGRAPHIC SHIFT



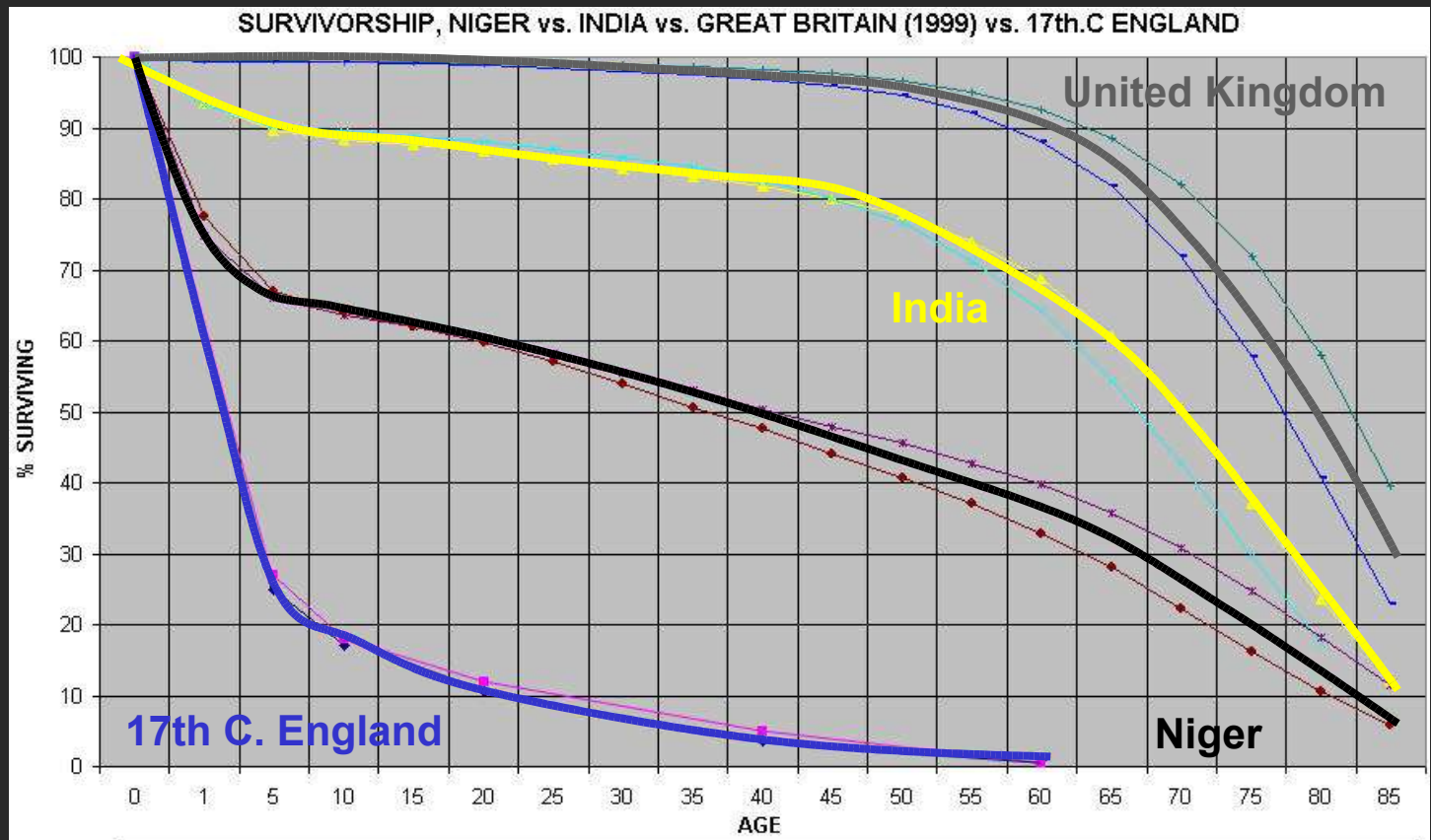
DEMOGRAPHIC SHIFT

STAGE 1: (Pre-modern)

- death rates and birth rates **both high**, but **balanced**
- **very slow** population growth (**<0.05%**)
- **disease** and **malnutrition** are common
- no **sewage disposal** or water systems
- **personal hygiene** is poor

True of all human populations until the late 18th century

DEMOGRAPHIC SHIFT



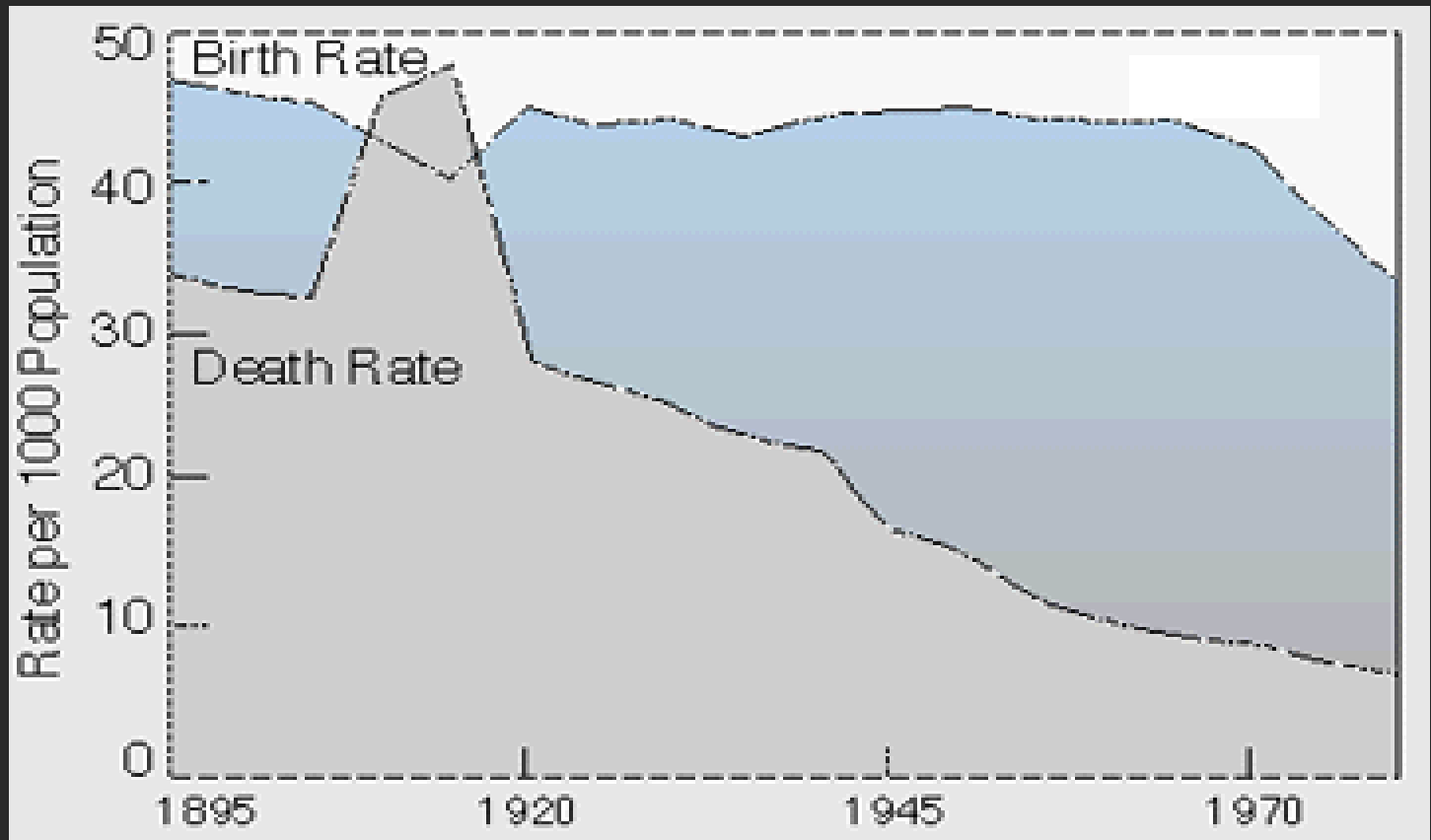
DEMOGRAPHIC SHIFT

STAGE 2: (Industrializing / urbanizing)

- death rates decline
(agricultural yields increase,
public health improvements)
- population explosion (rapid growth)
- child survivorship increases
(population momentum)

...Europe in the late 18th century

DEMOGRAPHIC SHIFT



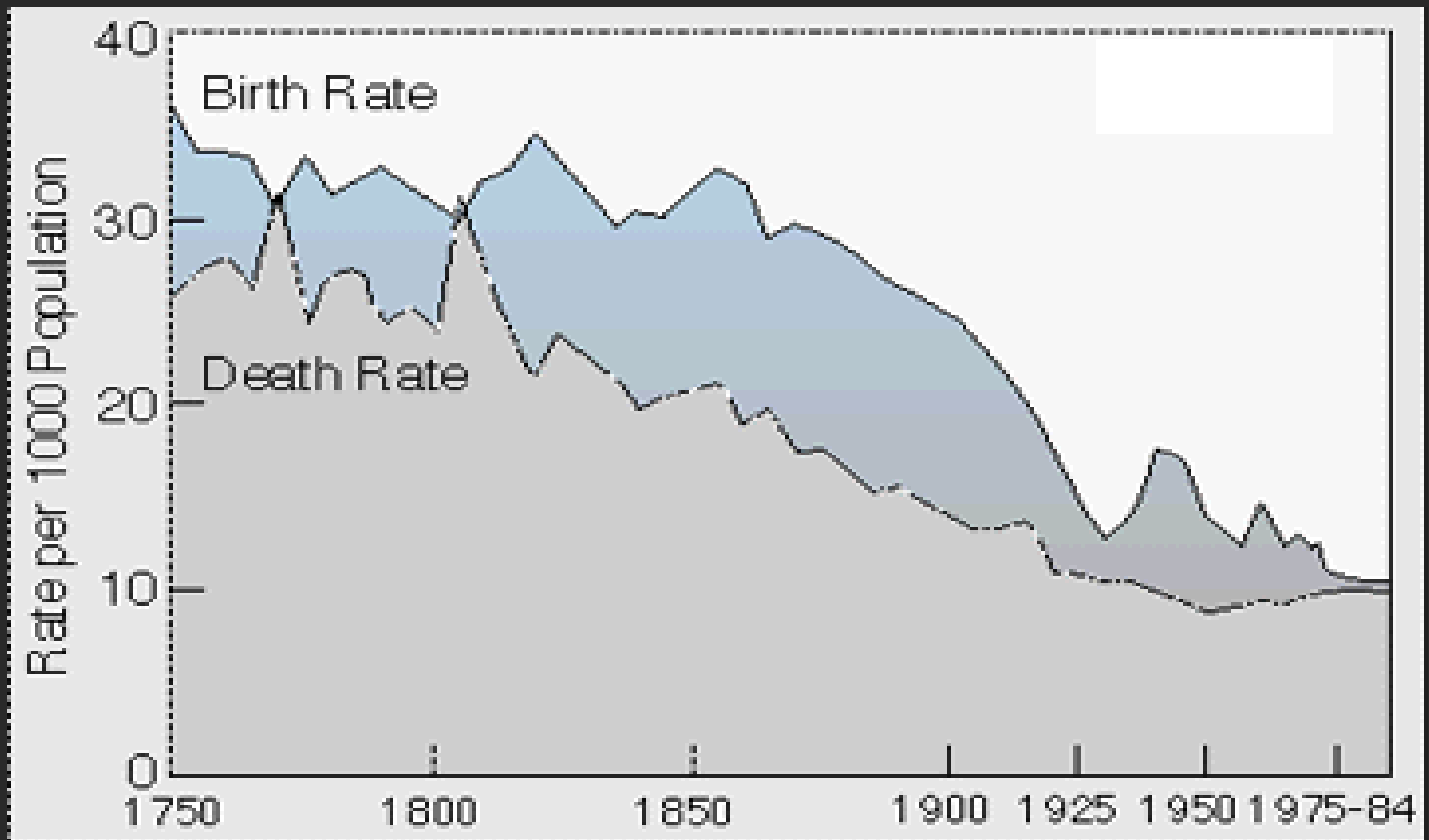
DEMOGRAPHIC SHIFT

STAGE 3:(Mature industrialization)

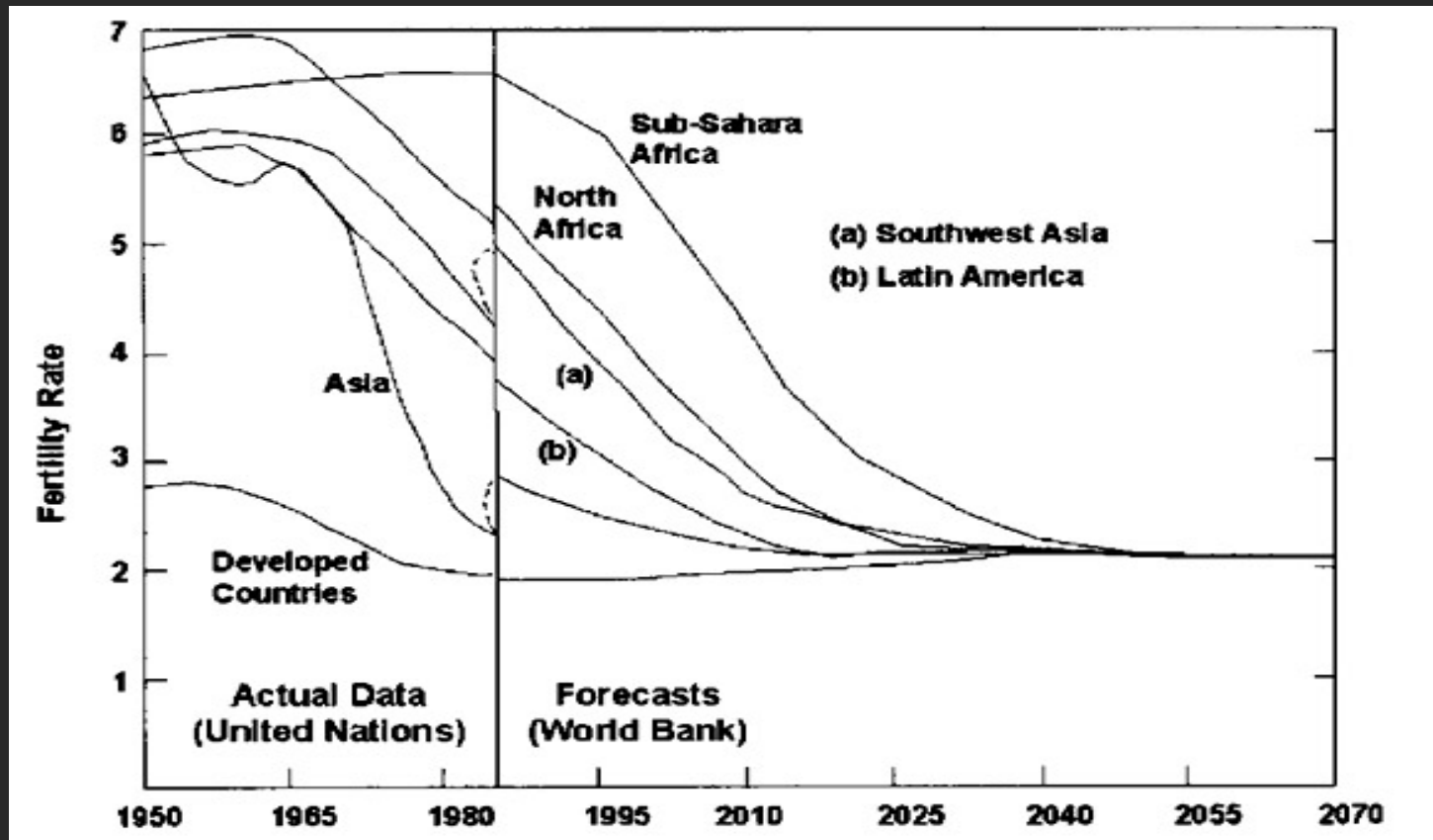
- birth rates decline
- population growth slows
- child survivorship in rural areas
- urbanization
- female literacy and employment
- contraceptive technologies

Began in Europe at end of 19th century

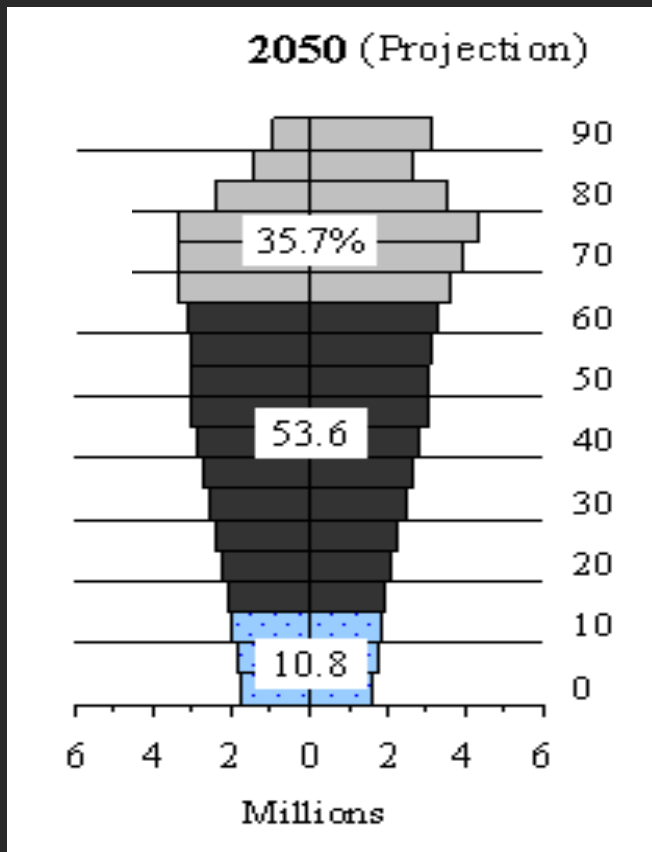
DEMOGRAPHIC SHIFT



DEMOGRAPHIC SHIFT



DEMOGRAPHIC SHIFT

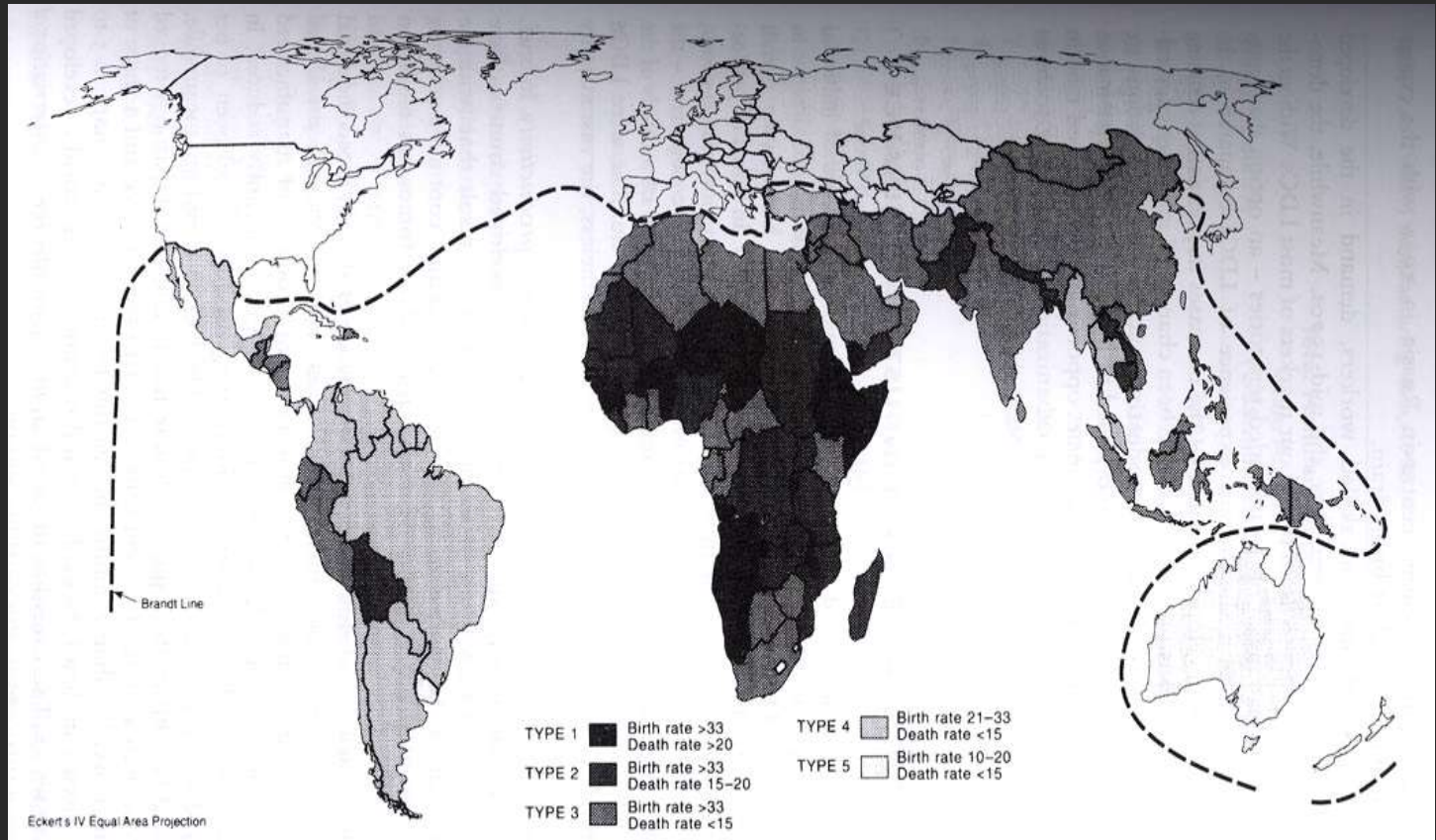


STAGE 4:(Post-industrial)

- low birth rates
- low death rates
- **stable populations**
- **aging populations**

Emerged in late 20th century

DEMOGRAPHIC SHIFT



INFECTIOUS DISEASE

1918: **Influenza**
pandemic kills **20 million** worldwide

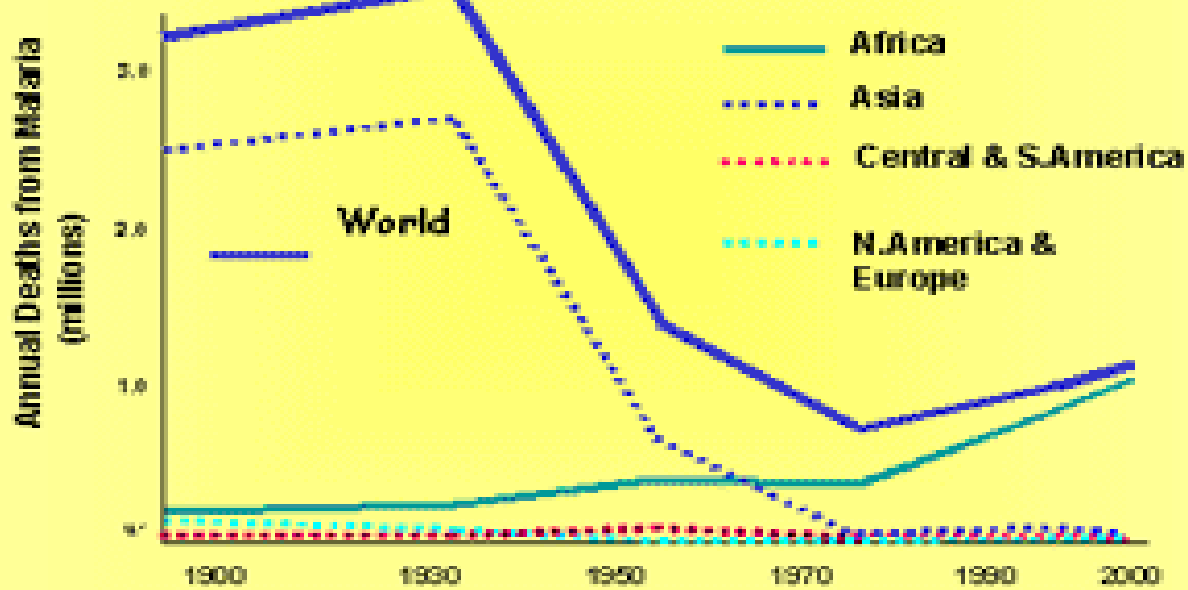
1939-45: **WW2** kills
40 million worldwide

2001: **HIV / AIDS**
deaths total **22 million** worldwide



INFECTIOUS DISEASE

Malaria Death Rates 1900-1999



Source: World Health Organization, Roll Back Malaria Program, 1999.

INFECTIOUS DISEASE

AIDS
IS EVERYONE'S PROBLEM

1991 400 DEATHS A MONTH
1/4 MILLION INFECTED

WHAT YOU CAN DO

- Get the facts and share them with your family and friends
- Know your sex partners
- Ask questions about past sexual history and drug use
- Be honest about your past

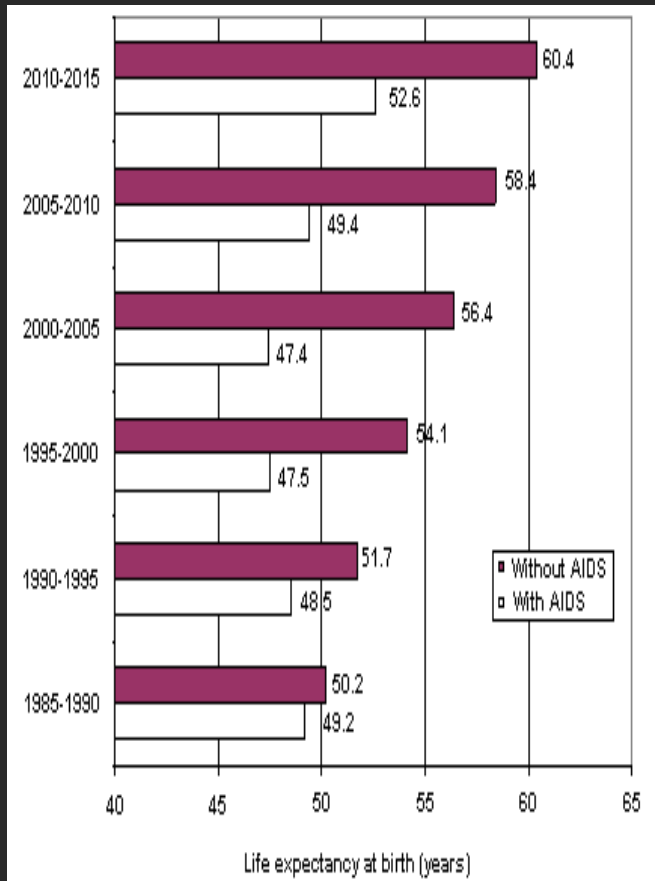
If you don't use a condom (sheath) for sexual intercourse, the AIDS virus cannot get through a condom if it is properly used and does not break. Never share drug needles.

Over 22 million have died of AIDS since 1980 (almost 1 in 5 are children).

42 million now live with HIV, the disease which leads to AIDS

...most of whom will die within the decade

INFECTIOUS DISEASE

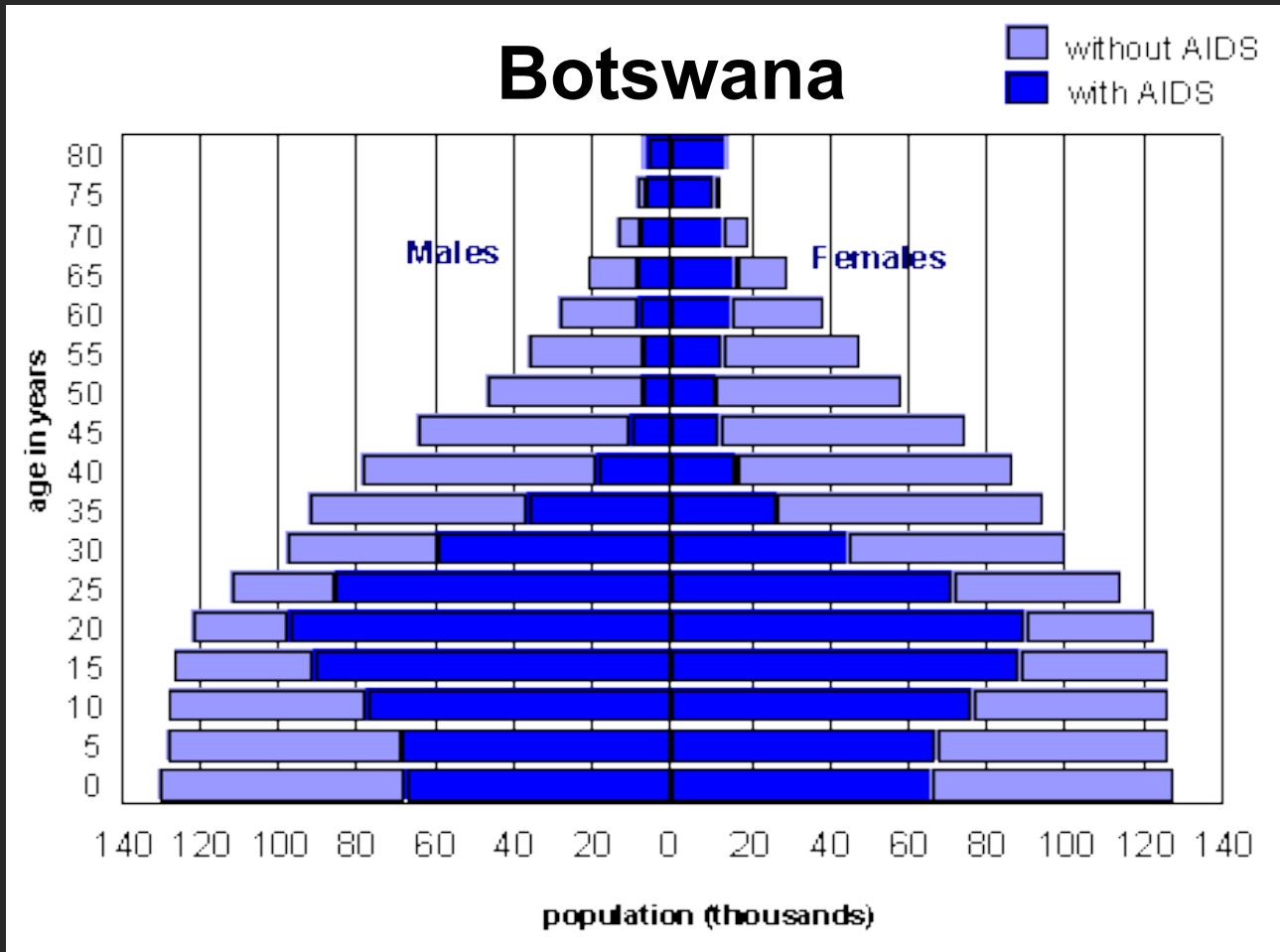


25.3 million in sub-Saharan Africa are infected with HIV

...reducing average life expectancy by **seven years**

In Botswana, **one of every four** adults is infected with HIV

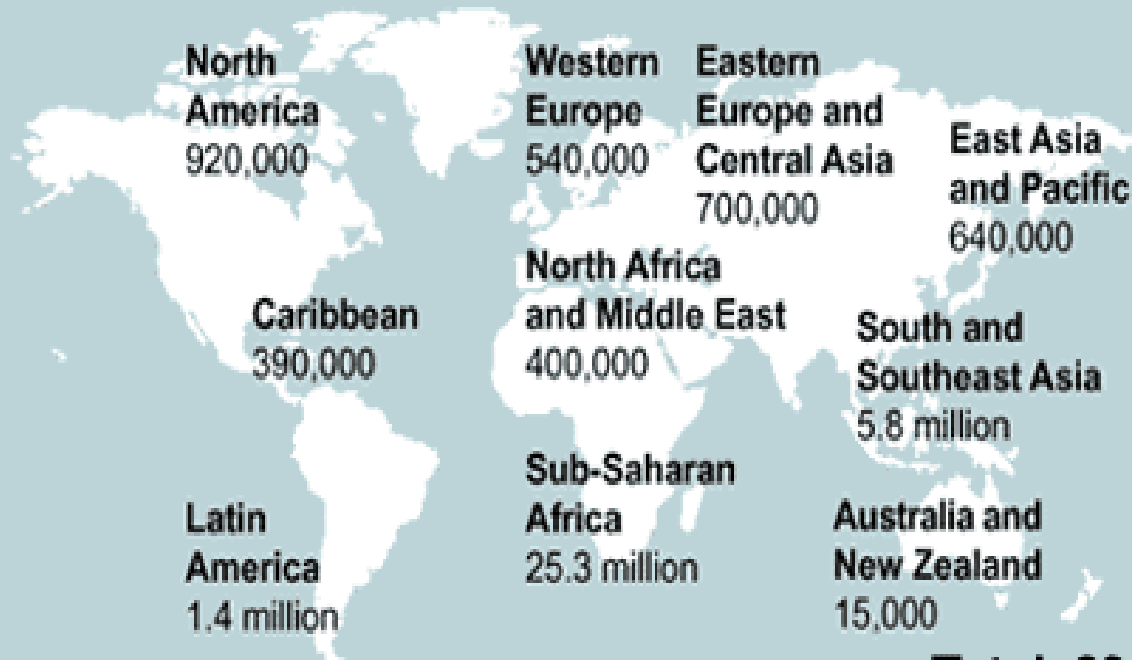
INFECTIOUS DISEASE



INFECTIOUS DISEASE

People estimated to be living with HIV/AIDS

As of 2000



Sources: ESRI; United Nations; AP

Total: 36.1 million



P O P U L A T I O N E X P L O S I O N

CARRYING CAPACITY



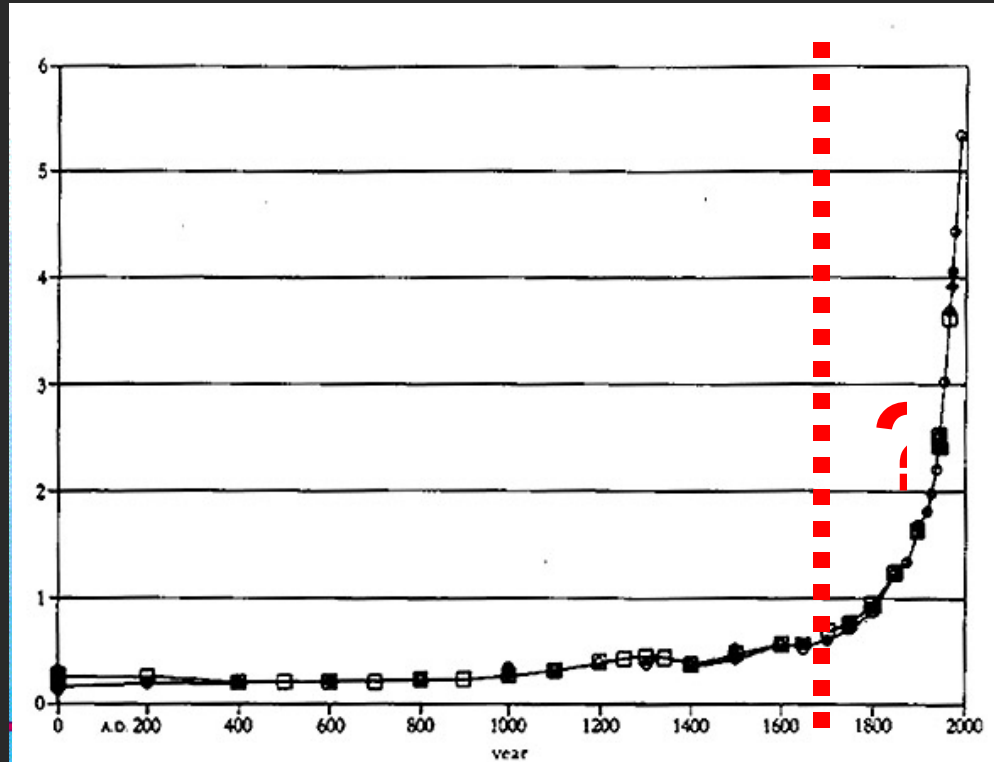
2001: **six billionth** human being is born

Many are concerned with growing human populations.

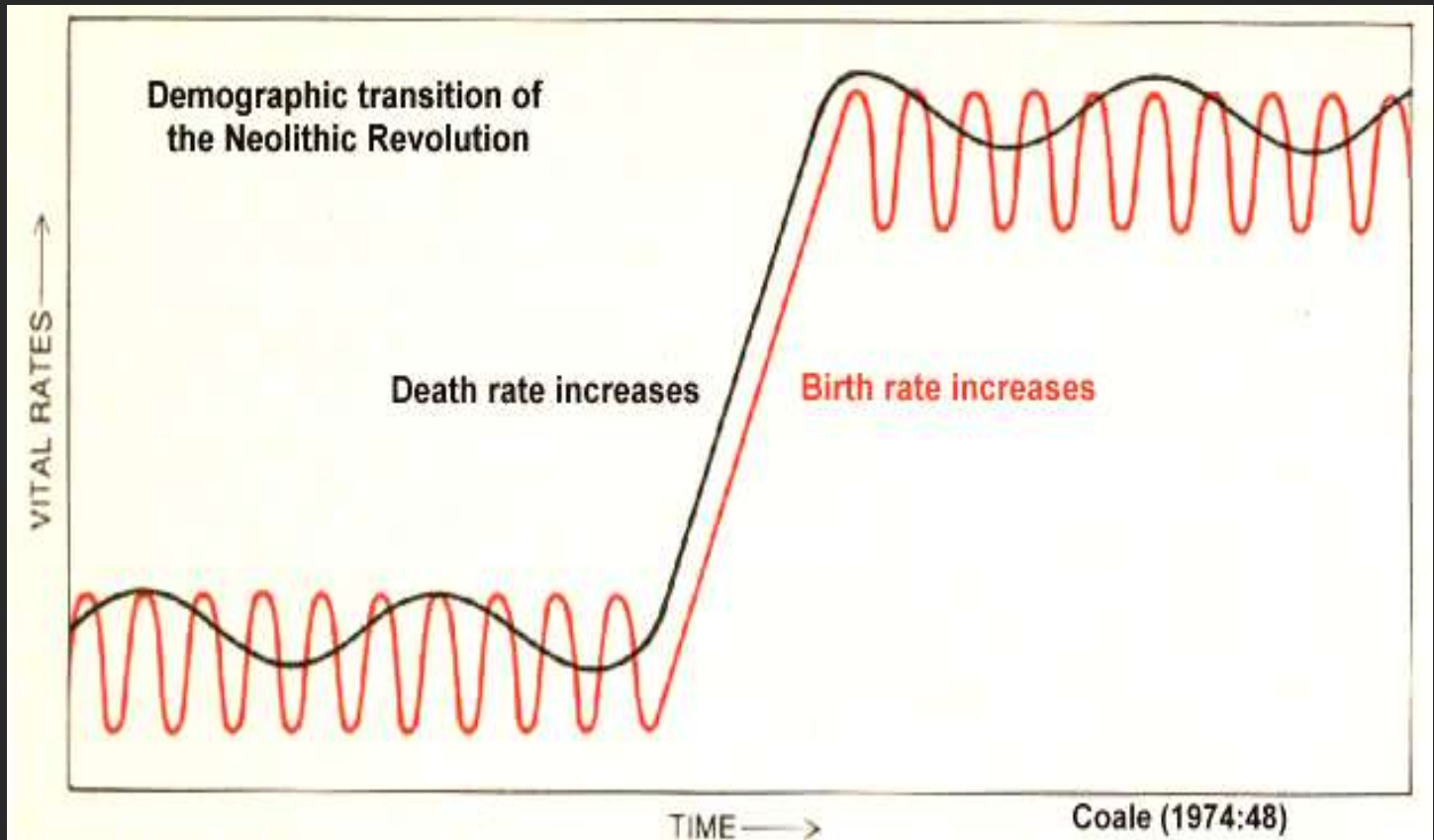
Simon (1981) “**more people = more minds** to invent solutions”

CARRYING CAPACITY

The maximum number of individuals an ecosystem can support, **LONG-TERM**

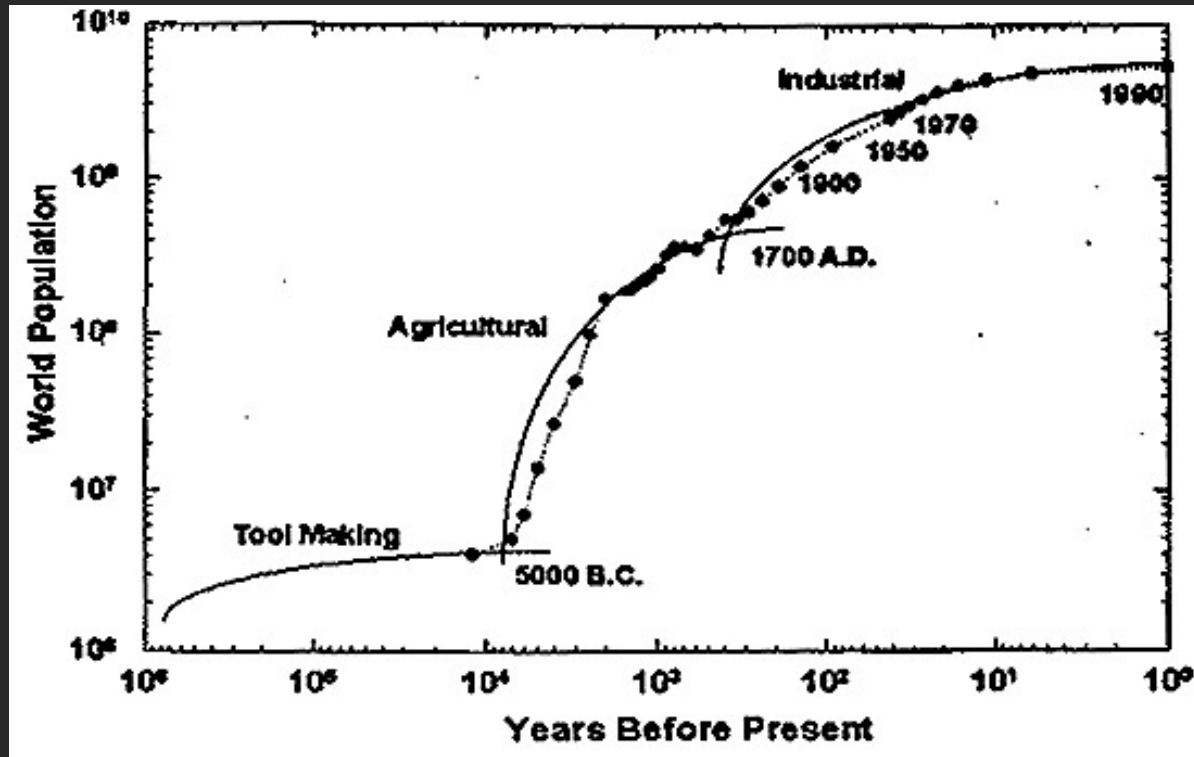


CARRYING CAPACITY



CARRYING CAPACITY

REMEMBER: limitations can often be changed by technological advances

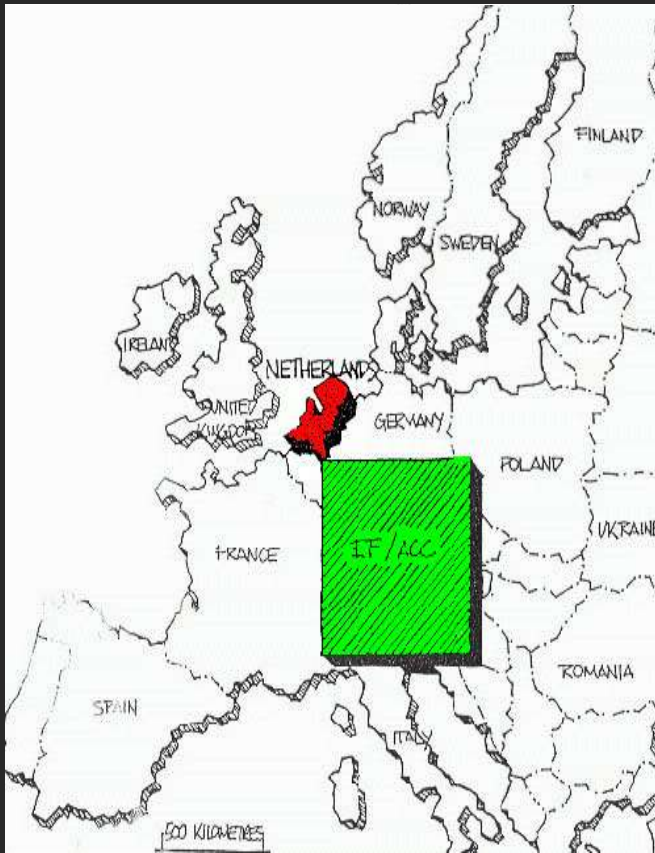


CARRYING CAPACITY



- I** IMPACT =
P POPULATION
A AFFLUENCE
T TECHNOLOGY
- environmentalism
 - decolonization
 - slower growth rates
- in developed world

CARRYING CAPACITY



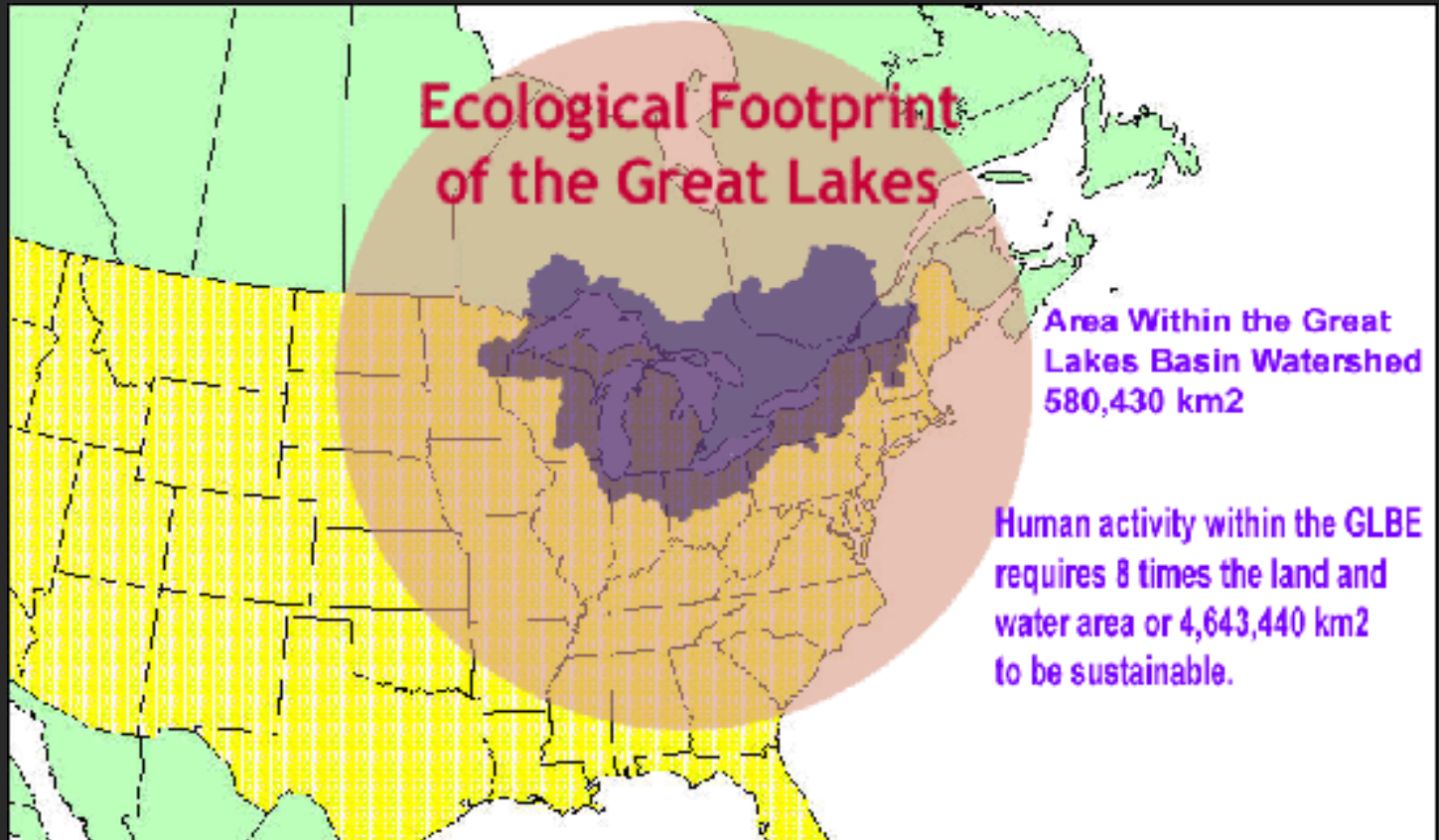
Wackernagel (1996)

“**ecological footprint**”

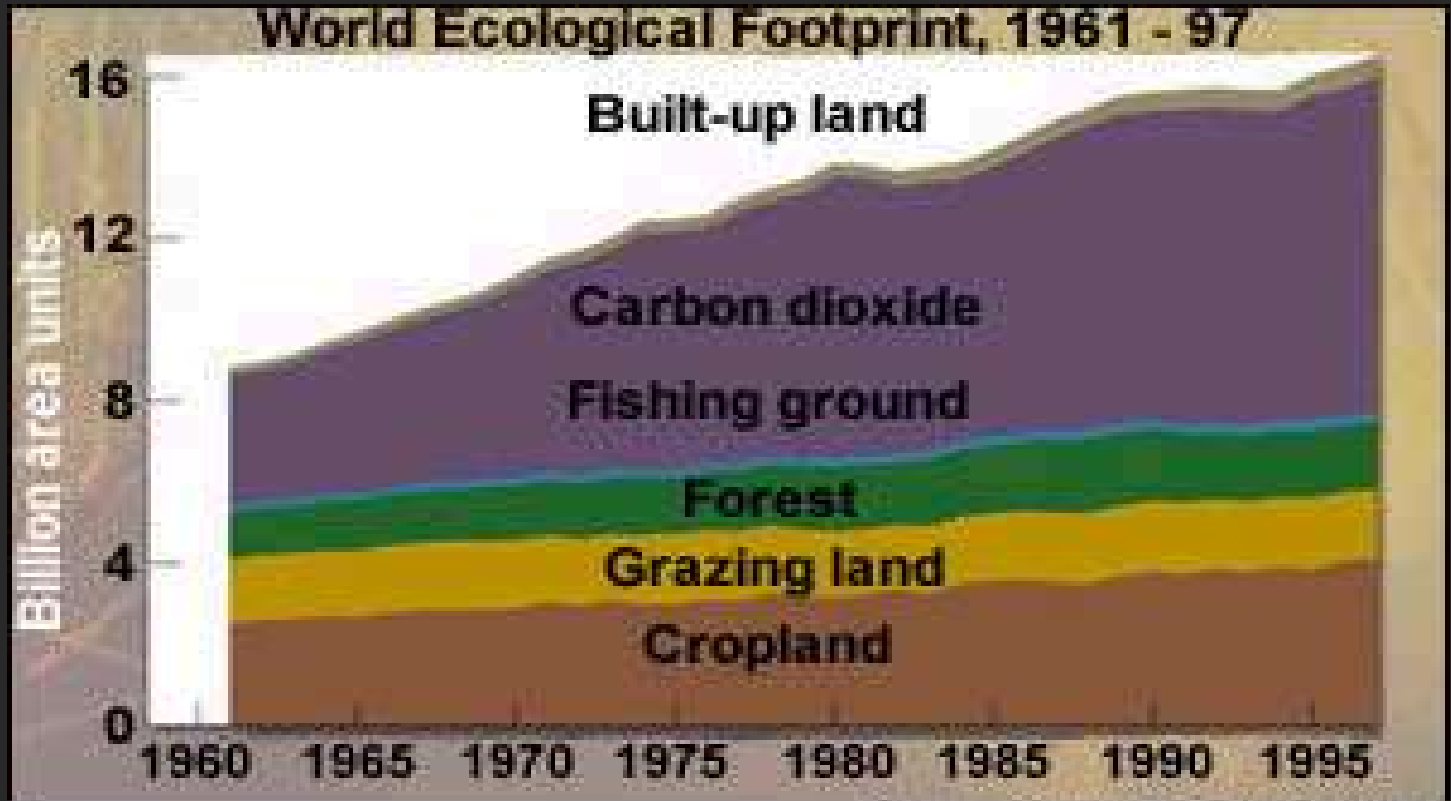
Attempts to measure the **productive space** necessary to support **consumption**

Biophysical measure of “**sustainability**”

CARRYING CAPACITY

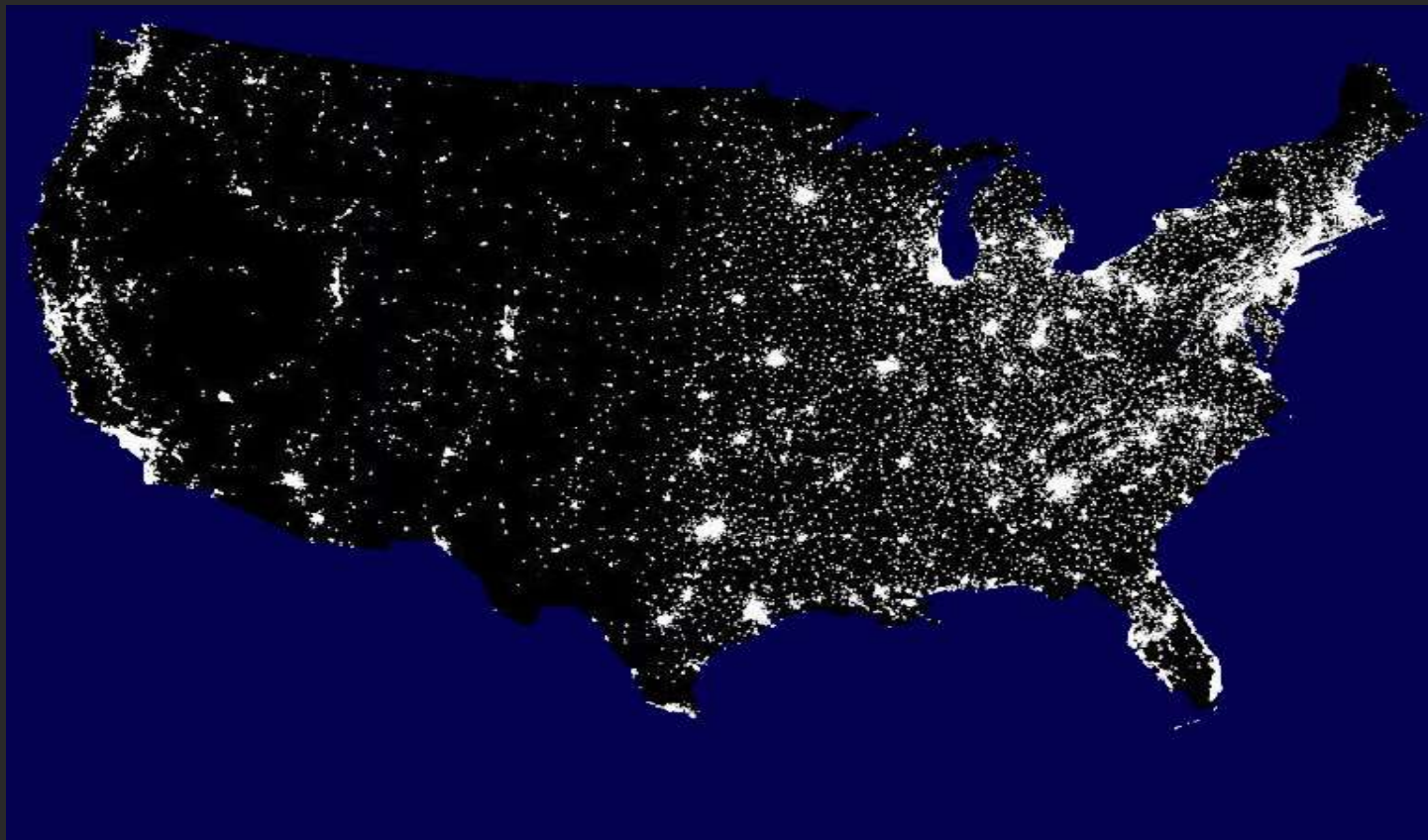


CARRYING CAPACITY

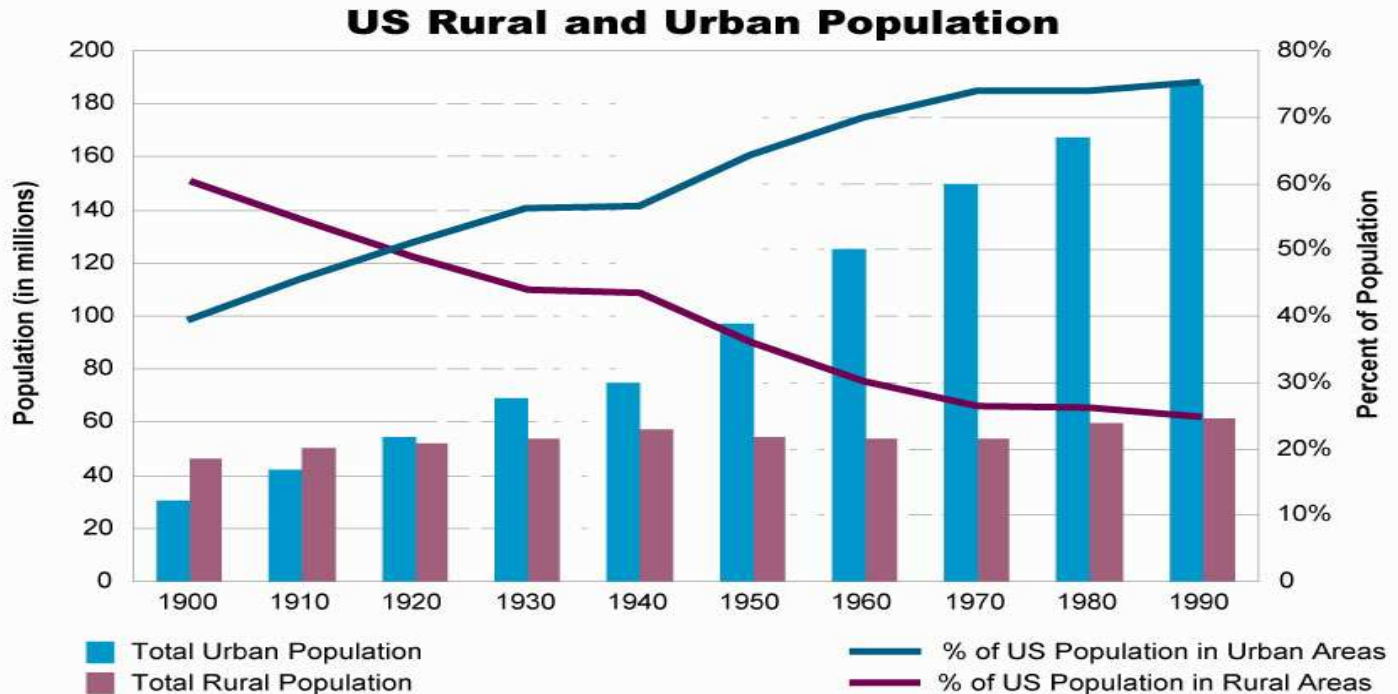


Source: Worldwide Fund for Nature

POPULATION DENSITIES



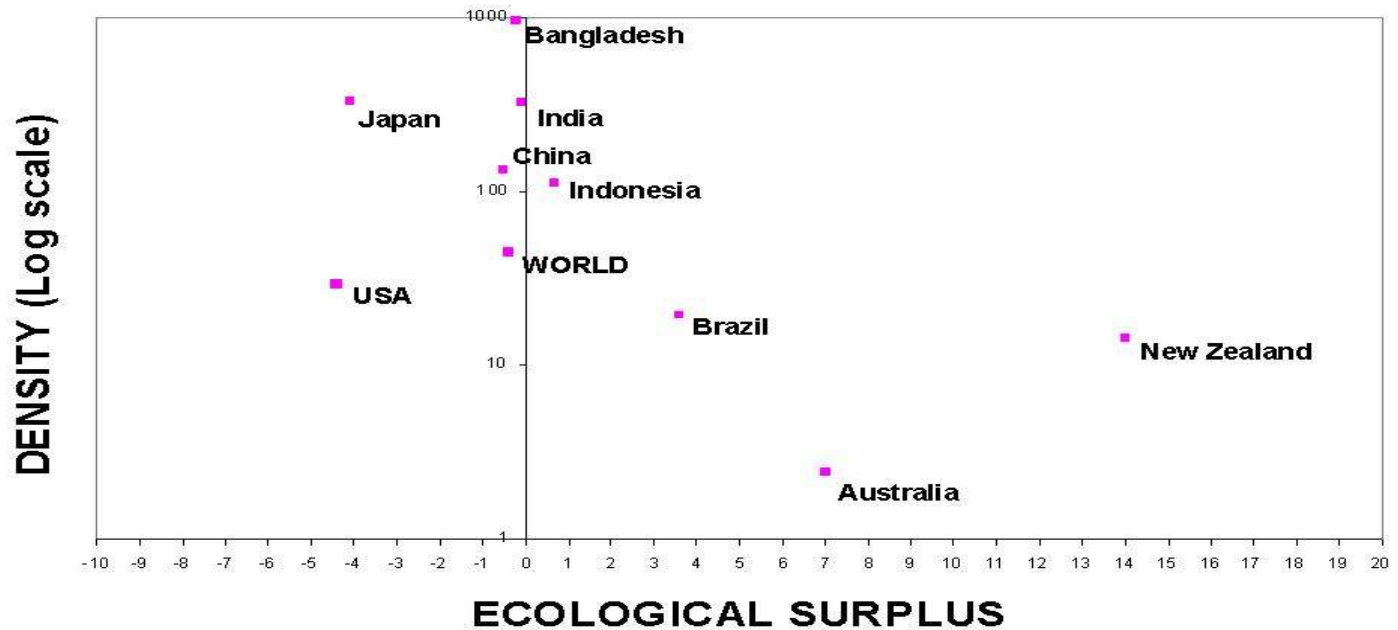
POPULATION DENSITIES




Essentially all 20th century US population growth has been in cities, increasing the urban population fraction from 40% in 1900 to more than 75% in 1990. This move to the cities is projected to continue.


POPULATION DENSITIES

DENSITIES AND DEFICITS



A black and white comic panel with a blue sky background. Calvin is riding a red toy car, and Hobbes is sitting on his back. They are in a forest with trees and bushes. A large speech bubble is coming from Calvin.

YOU KNOW, THE WORLD SHOULD'VE
BEEN DESIGNED SO EVERYONE
DIDN'T HAVE TO EAT EACH OTHER
TO SURVIVE. THERE SHOULD
JUST BE FEWER PEOPLE AND
ANIMALS TO BEGIN WITH.

A smaller black and white comic panel showing a close-up of Calvin and Hobbes. Calvin is still on the red toy car, and Hobbes is on his back. Calvin is speaking.

AND THE WORLD CERTAINLY
COULD'VE USED A MORE EVEN
DISTRIBUTION OF ITS RESOURCES,
THAT'S FOR SURE.